

Plugging Brake System as a Hill Descend Control for Electric Powered Wheelchair: Experimental Analysis

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Abstract:

The common brake system for the electric powered wheelchair (EPW) is the mechanical brake system. Although the mechanical brake system is compact, the brake performance is depending on the user's hand grip. During descending on the slope, due to the gravitational force, the possibility of EPW to accelerate is high. In this study, by using the plugging brake system strategy, the hill descend control is proposed to control the speed of EPW. The plugging brake system will maintain the speed of EPW same as the desired speed that set by the user. In this plugging brake control system, the PID control is applied to minimize the error between the actual and desired speed. The experiment is performed on the slope based on the requirement from the American Disability Act (ADA) with maximum angle of 8.1 degrees and the slope length is 5.4 m. From the experimental results, the speed of EPW is maintaining at the desired speed during descending on the slope. These results prove the plugging brake control system is suitable for hill descend control

Keywords : Plugging Brake System; Electric Powered Wheelchair; PID Control; Hill Descend Control

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